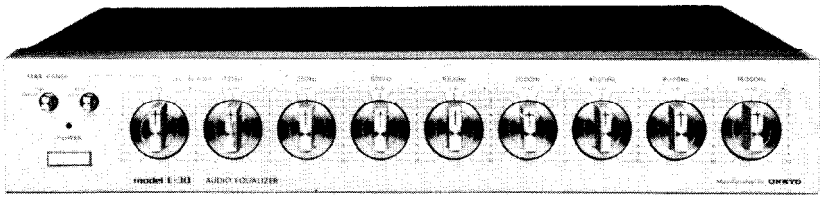
ONKYO® SERVICE MANUAL

OCTAVE BAND
STEREO EQUALIZER
Model E-30



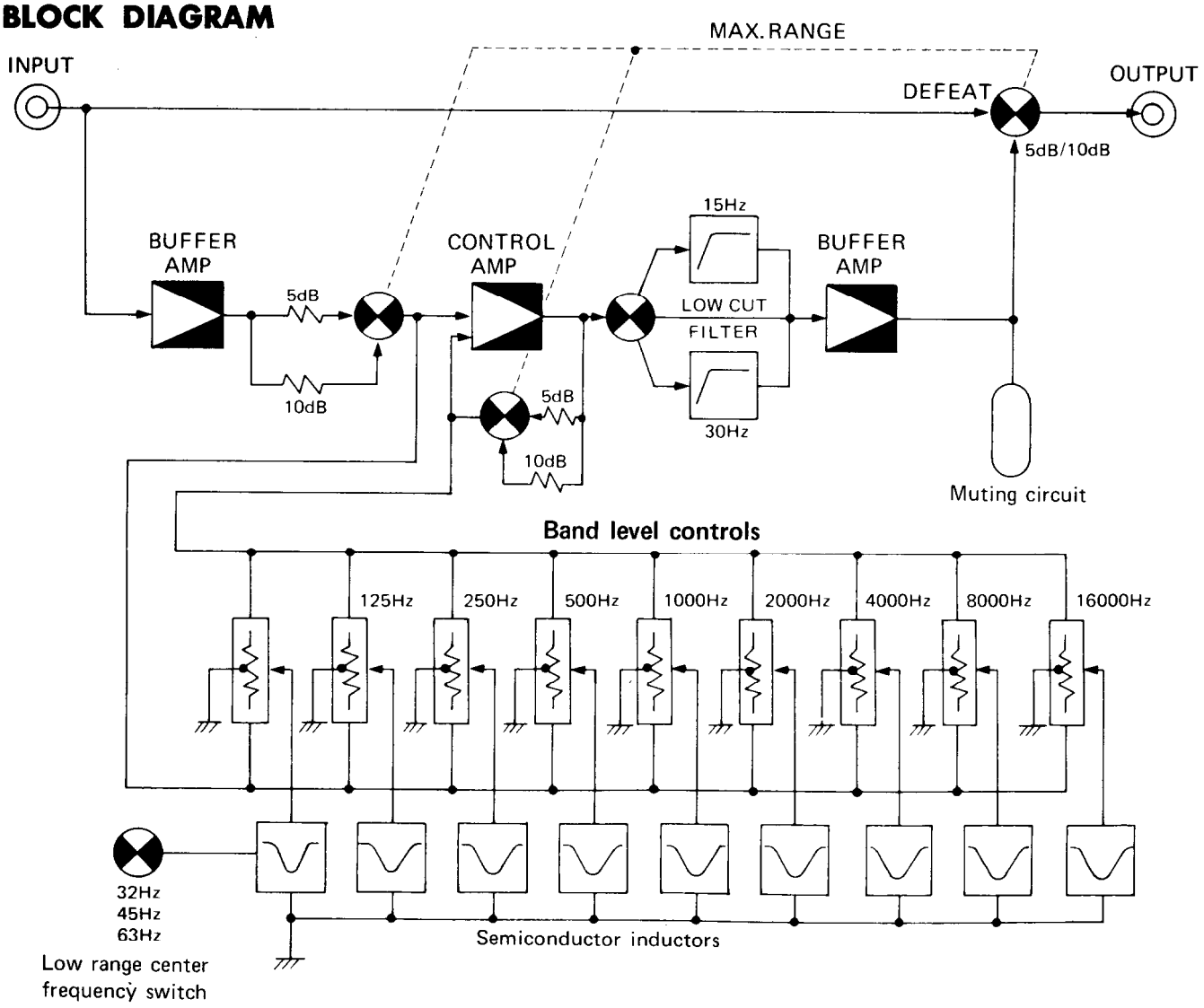
SPECIFICATIONS

Output Voltage and Impedance: (with All Controls at FLAT)	(Rated) 1.5V, 600 ohms (Max.) 15V, 600 ohms	Center Frequencies:	32Hz/45Hz/63Hz Switchable, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz
Input Sensitivity and Input Impedance:	1.5V, 100 kohms	Band Level Control	−10 dB～10 dB (1 dB steps) −5 dB～5 dB (0.5 dB steps)
Frequency Response: (with All Controls at FLAT)	5 Hz – 100 kHz (+0 dB, −1.5 dB)	Gain:	0 dB (Controls at FLAT)
Total Harmonic Distortion: (3V Output, Controls at FLAT)	Less than 0.01% (20Hz – 20kHz)	Low Cut Filter	15 Hz, 30 Hz
Intermodulation Distortion: (at Rated Output, Controls at FLAT, SMPTE 70Hz:7kHz=4:1	Less than 0.01%	Muting Operation Time: (Power ON/OFF)	8 sec./0.1 sec.
Signal to Noise Ratio:	More than 100 dB IHF-A Network (Input Shunt)	Semiconductors:	68 Transistors, 21 Diodes
		Power Supply:	AC 120V 60 Hz or 220V 50 Hz
		Dimensions:	450(W) x 83(H) x 360(D) mm
		Weight:	6.5 kg

Specifications are subject to change without notice

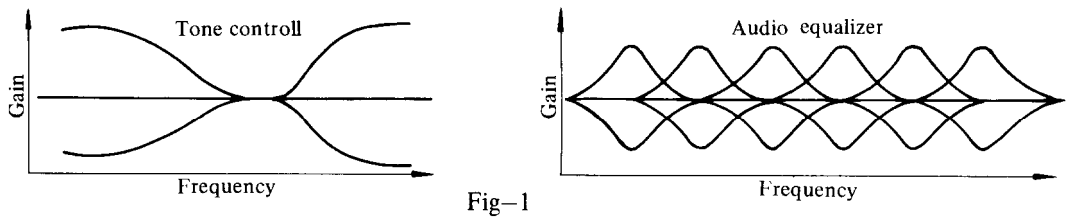
ONKYO®
AUDIO COMPONENTS

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

An ideal flat amp is of course the most desirable type of preamplifier to have. However because cartridge and speaker characteristics along with room conditions are not necessarily ideal, the sound that reaches the listener's ears is usually a waveform that has many peaks and dips. If these peaks and dips are large, the influence they have may become audible. It is at this point that some sort of control over sound quality becomes necessary. One easy to use means of doing this is the ordinary type of tone controls that correct high and low range response. The purpose of an audio equalizer such as the E–30 is to go a step further and give the user the means to emphasize or attenuate the sound at many points on the audio spectrum and thereby greatly improve the audible sound.

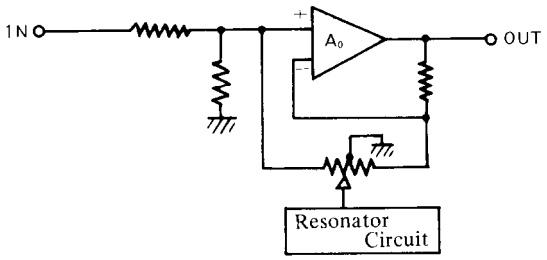


Fig–1

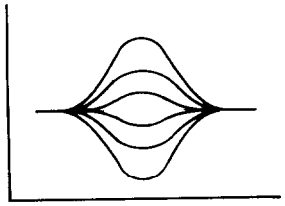
The E–30 is equipped with nine band level controls for nine center frequencies. Furthermore the lowest center frequency may be switched between three points. With the MAX RANGE knob, the amount of emphasis and attenuation may be switched between ±10dB and ±5dB or set to DEFEAT in which case the entire equalizer circuitry is bypassed.

The circuitry is all stage A–class push–pull with outstanding performance characteristics.

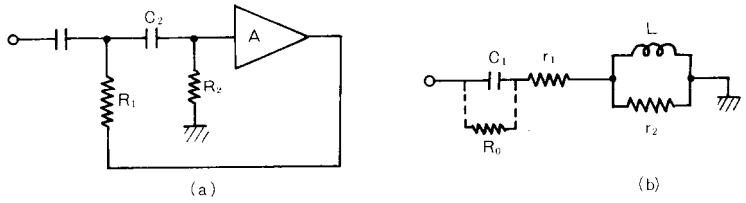
The input signal after changing inpedance at the Darlington buffer amp, enters the control amp.



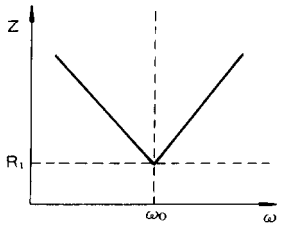
Fig–2



Fig–3



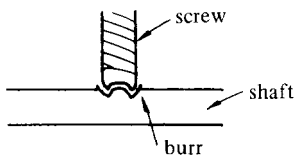
Fig–4



Fig–5

The control amp is constructed as shown in fig. 2. The circuit produces the resonance characteristics shown in fig. 3 by means of the inclusion of semiconductor inductor and capacitor resonance circuits in the amplifier input circuit and negative feedback circuit. Semiconductor inductors which are resistant to magnetic flux distortion and electromagnetic inductances are employed in the resonance circuits. The basic principle is shown in fig. 4 (a). If this is made into an equivalent circuit as shown in fig. 4 (b), it becomes a pseudo L.C.R series resonance circuit. If r_2 is large enough, the resonance point will be: $\omega o = \frac{1}{\sqrt{C_1 C_2 R_1 (AR_2 - R_1)}}$ with the characteristics shown in fig. 5 where the impedance at the resonance point is R1. Furthermore, Ro, which is inserted in parallel with C1, is for the purpose of matching the impedance of the DC side of the resonance characteristics with the high frequency side. A Darlington emitter follower buffer amp is used for the output to minimize outside influence on the resonance characteristics obtained by the control amp. To prevent transient distortion and noise when the power is turned on, a break type relay transient killer is placed in the output circuit. (Transient killer operation time: about 8seconds)

SERVICE GUIDE



(1) If the knob will not come off even after loosening the knob screw it is probably because there is a burr in the shaft as shown in the diagram. In this case pull out on the knob while turning it to the right and left or turn the knob in either direction as far as it will go and then force it a bit further.

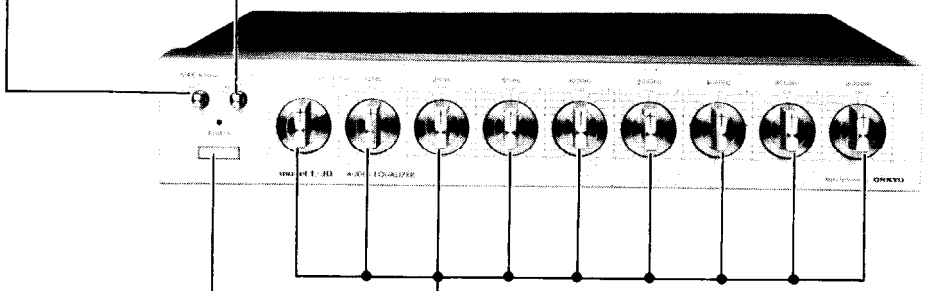
FRONT PANEL FACILITIES

MAX RANGE Selector:

This selector allows the user to vary the maximum emphasis or attenuation between ±10dB and±5dB. In the DEFEAT position the equalizer circuitry is bypassed giving a flat response. In this case sound still be heard even if the unit is off but the sound quality is better if the unit is left on.

Low range center frequency selector:

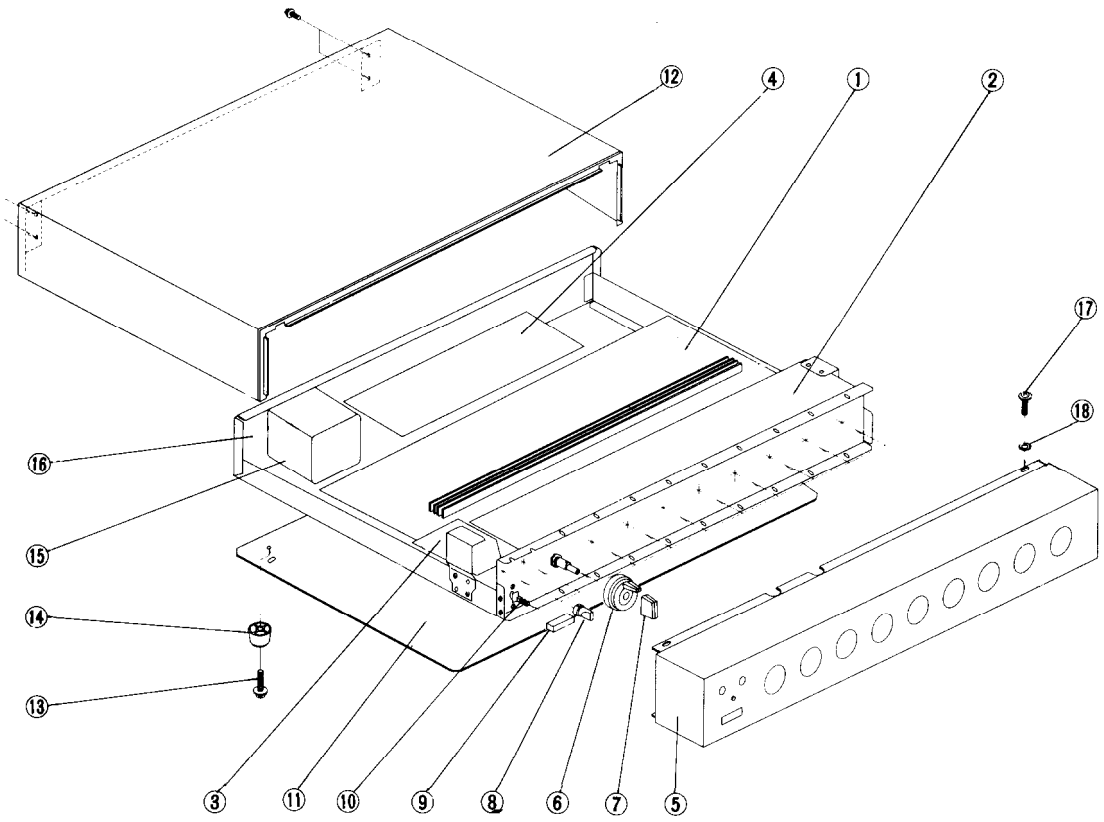
The center frequency of the lowest of the band level controls may be switched between three points: 63Hz, 45Hz, and 32Hz.
These are useful for dealing with speaker characteristics and room conditions.



POWER Switch

Band Level Controls (Middle for Left Channel, Outside for Right Channel)

EXPLODED VIEW



PARTS LIST

120V Model

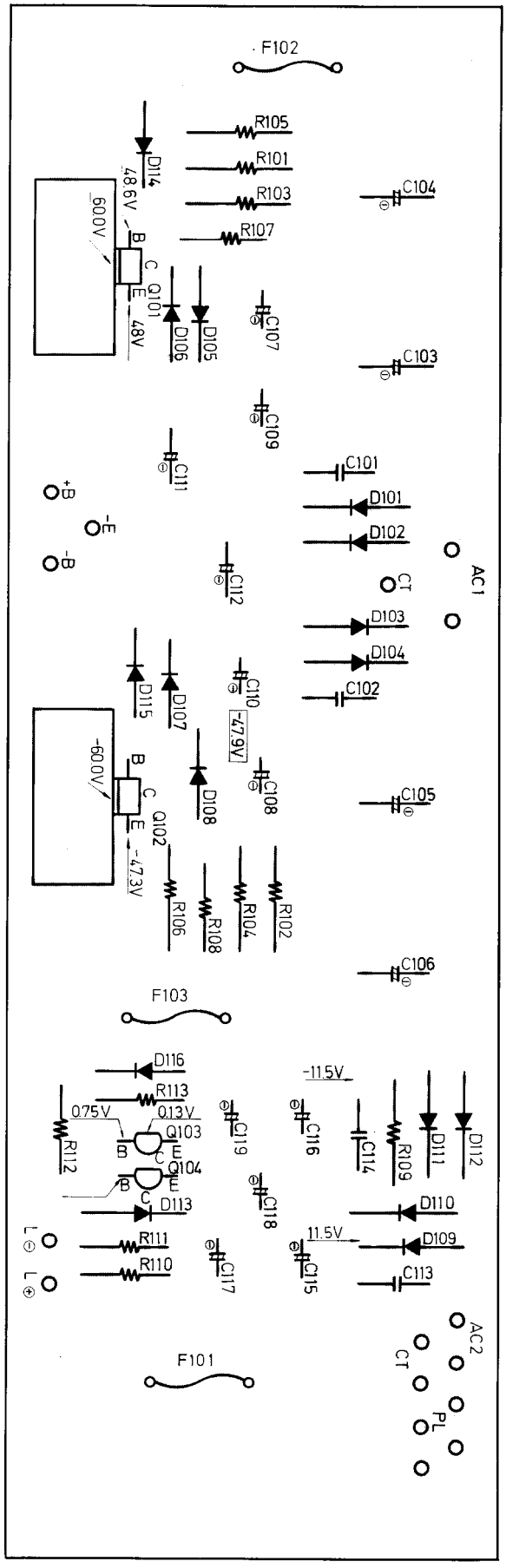
REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1	U1	12851520	NAEQ-420, Equalizer p.c.b.
2	U2	12851521	NAVR-421, Volume Control p.c.b.
3	U3	12851522	NASW-422, Switch p.c.b.
4	U4	12851523	NAPS-423, Power Supply p.c.b.
5		12759121	Front Panel Ass'y
	A501	27210088	Front Panel
	A502	28125037-1	End Cap L
	A503	28125038-1	End Cap R
	A505	28198505	Facet for Power Indicator
	A507	27267018	Guide for Power Switch
	A510	28140081	Cushion for Facet
6	A804	28320196A	Knob E
7	A803	28320182	Knob V
8	A802	28320183	Max. Range and Low Frequency Selector Knob
9	A801	28320168A-1	Power Switch Knob
10	S0001	25035015	NPS-111LA3, Power Switch
11	A601	27170031A	Bottom Board
12	A351	28110123	Top Cover
13	A604	831130162	3STW+16BQ, Tapping Screw
14	A602	280379	Leg
15	T0001	230223	NPT-625D, Power Transformer
16	A021	27120100	Back Panel
17	A508	831130082	3STW+8BQ, Tapping Screw
18	A509	87313006	M3-B, Toothed Lock Washer
	PL001	210015A	6.3V 50mAW3ULRED, Power Indicator Light
	C0001	3504012	0.01μF 125V, UL Capacitor
	S0002	25065027	NSS-4329, Low Cut Filter
	P0001, P0002	25045035	NPJ-2PRBL12, Input/Output Terminal
	P0003	270665	Ground Terminal
		253072	AS-UC, Power Supply Cord
		260208	SKB-1, Binder
	A001	27110044A	Front Bracket
	A002	27190010	Holder for Lamp
	A004	27115021	Side Bracket R
	A005	27115022	Side Bracket L
	A022	270025	SR-3P-4 (UL), Strainrelief
	A356	27270020	Spacer
	A603	28140085	Cushion for Power Supply p.c.b.
	R0001	431523355	3.3MΩ ½W, Solide Resistor

220V Model

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1	U1	12851520	NAEQ-420, Equalizer p.c.b.
2	U2	12851521	NAVR-421, Volume Control p.c.b.
3	U3	12851522	NASW-422, Switch p.c.b.
4	U4	12851523	NAPS-423, Power Supply p.c.b.
5		12759121	Front Panel Ass'y
	A501	27210088	Front Panel
	A502	28125037-1	End Cap L
	A503	28125038-1	End Cap R
	A505	28198505	Facet for Power Indicator
	A507	27267018	Guide for Power Switch
	A510	28140081	Cushion for Facet
6	A804	28320196A	Knob E
7	A803	28320182	Knob V
8	A802	28320183	Max. Range and Low Frequency Selector Knob
9	A801	28320168A-1	Power Switch Knob
10	S0001	25035015	NPS-111LA3, Power Swit
11	A601	27170031A	Bottom Board
12	A351	28110123	Top Cover
13	A604	831130162	3STW+16BQ, Tapping Screw
14	A602	280379	Leg
15	T0001	230224	NPT-625G, Power Transformer
16	A021	27120101	Back Panel
17	A508	831130082	3STW+8BQ, Tapping Screw
18	A509	87313006	M3-B, Toothed Lock Wash
	PL001	210015A	6.3V 50mAW3ULRED, Power Indicator Light
	C0001	3500052	PME271Y510CEE, IS Capacitor
	S0002	25065027	NSS-4329, Low Cut Filter
	P0001, P0002	25045035	NPJ-2PRBL12, Input/Output Terminal
	P0003	270665	Ground Terminal
		253072	AS-UC, Power Supply Cord
		260208	SKB-1, Binder
	A001	27110044A	Front Bracket
	A002	27190010	Holder for Lamp
	A004	27115021	Side Bracket R
	A005	27115022	Side Bracket L
	A022	270025	SR-3P-4 (UL), Strainrelief
	A356	27270020	Spacer
	A603	28140085	Cushion for Power Supply p.c.b.
	R0001	431523355	3.3MΩ ½W, Solide Resistor

RECTIFIER PC BOARD VIEW

FROM BOTTOM SIDE



RECTIFIER PC BOARD(NAPS–423)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Transistors	
Q101	2200744	2SD526(Y)
Q102	2200413	2SB596(Y)
Q103	2210085	2SC733(GR)
Q104	2210743	2SC945Ⓛ(P)
	2210085 or	2SC733(GR) or
	Diodes	
D101–D104	223827	1S1887
D105–D108	223916	WZ240
D109–D113	223802	1S1885
D114–D116	223105	1S1555
	Elect. Capacitors	
C103–C106	3500044	470μF, 80V
C107, C108	352771011	100μF, 63V
C109, C110	352774701	47μF, 63V
C111, C112	352783311	330μF, 50V
C115–C117	352741011	100μF, 16V
C118	352742211	220μF, 16V
C119	352744701	47μF, 16V
	Metal Resistors	
R105, R106	451631004	10Ω 1W
	Metal Oxide Film Resistors	
R101, R102	441621524	1.5kΩ 1W
R103, R104	441621224	1.2kΩ 1W
R109	441624714	470Ω 1W
	Fuses	
	252023	0.5A–T
	252001	1A–T
	Fuseholders	
	250113	S–N5051
	Radiators	
	27160021	RAD–06B P–2

VOLUME CONTROL PC BOARD (NAVR–421)–PARTS LIST

	Variable Resistors	
R101–R109	5104048	N40DDL21C250KT25M

SWITCH PC BOARD (NASW–422)–PARTS LIST

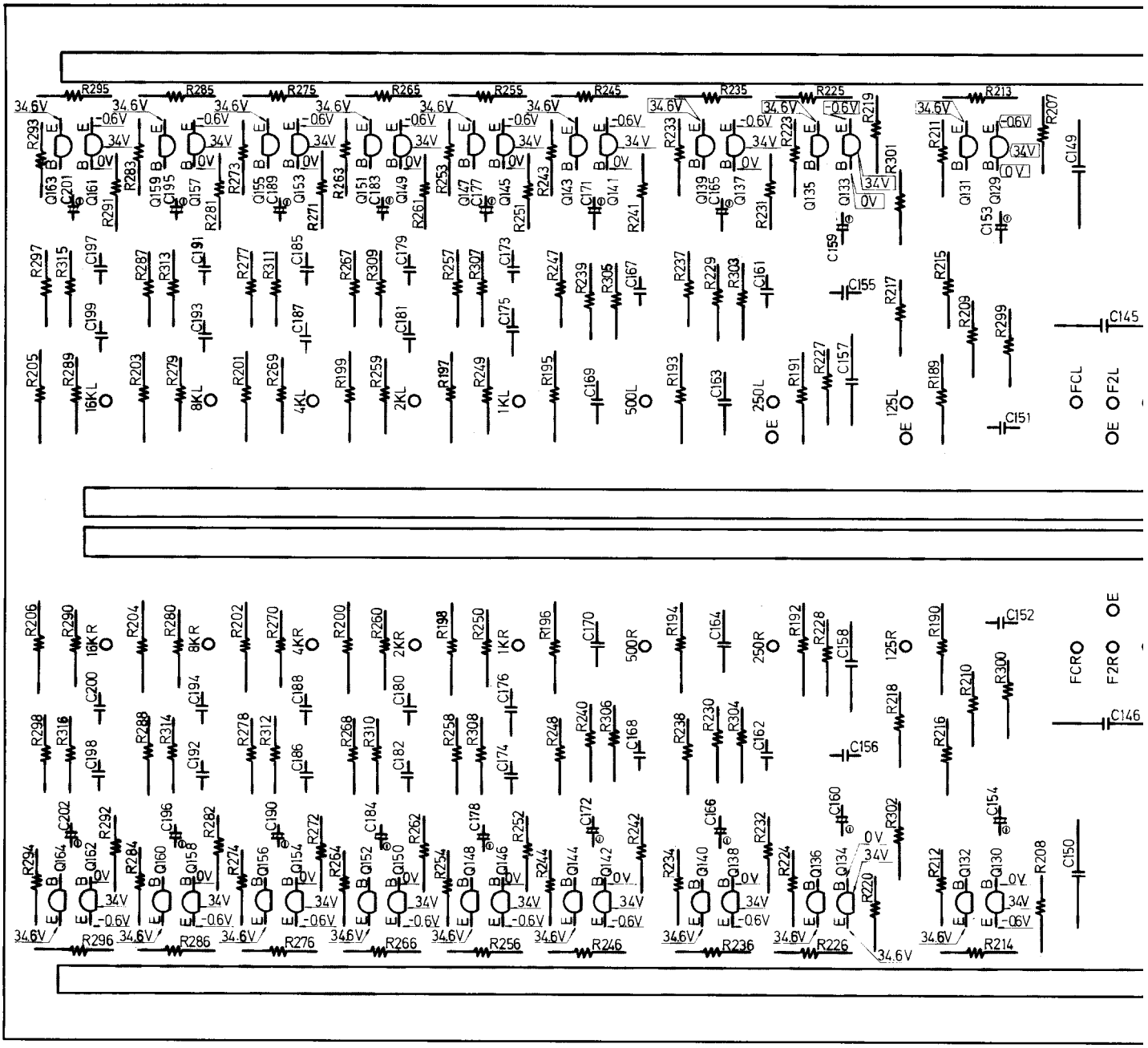
	Rotaly Switches	
S101	25030080	NRSM–163–15ZV
S102	25030081	NRSM–143–15ZV

NOTES:

DE: Non-Inductive Polyester Film Capacitor
LD: Low-Leakage Current Type Electrolytic Capacitor
SLD: Low-Leakage Current Type Electrolytic Capacitor
ST: Polystyren Film Capacitor
NP: Non-polar Electrolytic Capacitor

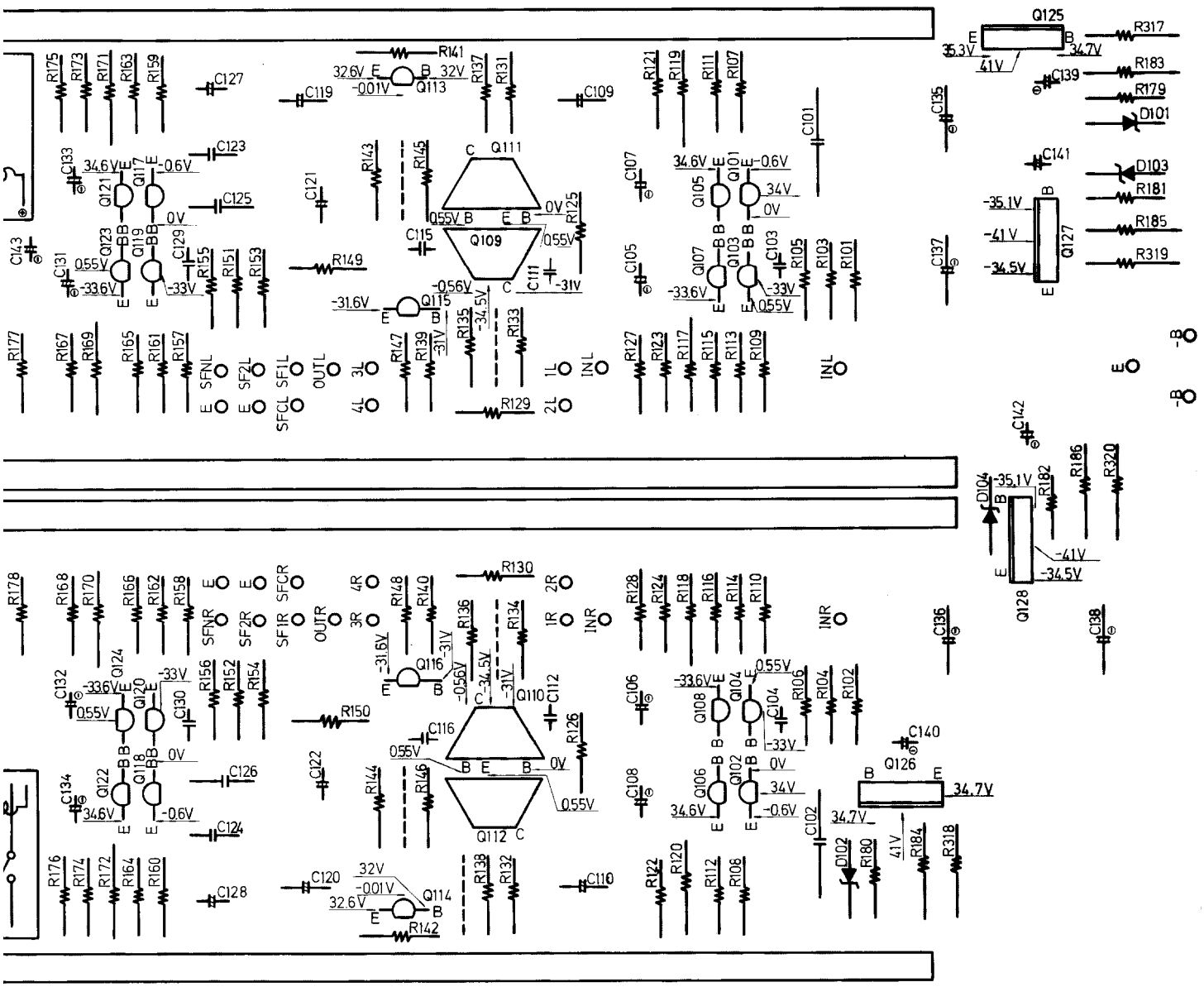
When replacing differential amplifier or push-pull amplifier transistors, be sure that transistors of one channel have the same h_{FE} ratings.

AUDIO EQUALIZER PC BOARD VIEW FROM BOTTOM SIDE



AUDIO EQUALIZER PC BOARD(NAEQ-420) PARTS LIST

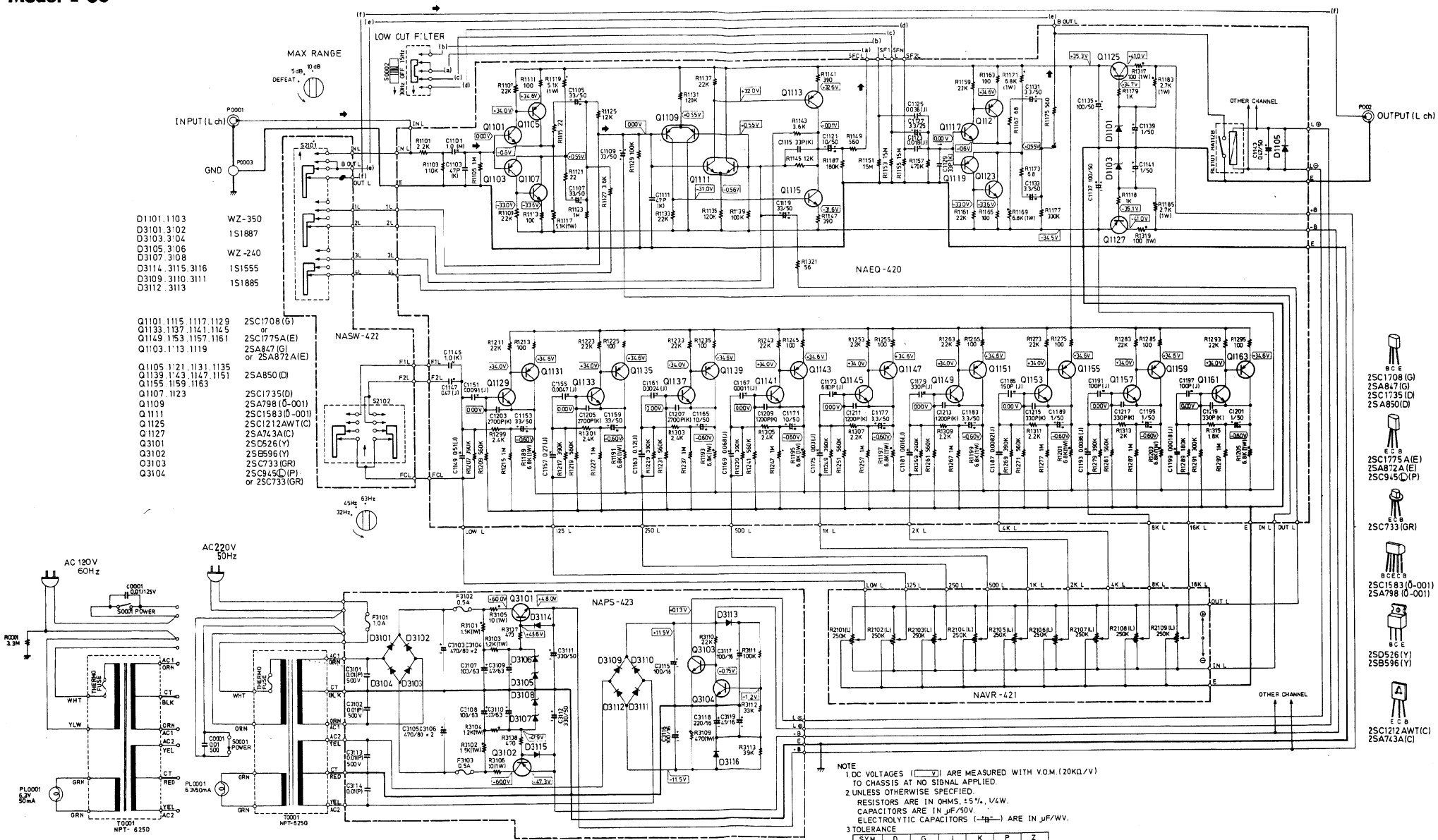
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Transistors	
Q101, Q102	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q103, Q104	2211207 or 2211085	2SA847(G) or 2SA872A(E)
Q105, Q106	2210834	2SA850(D)
Q107, Q108	2210844	2SC1735(D)
Q109, Q110	2211140	2SA798(0–001)
Q111, Q112	2210700	2SC1583(0–001)
Q113, Q114	2211207 or 2211085	2SA847(G) or 2SA872A(E)
Q115–Q118	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q119, Q120	2211207 or 2211085	2SA847(G) or 2SA872A(E)
Q121, Q122	2210834	2SA850(D)
Q123, Q124	2210844	2SC1735(D)
Q125, Q126	2210863	2SC1212AWT(C)
Q127, Q128	2210853	2SA743A(C)
Q129, Q130	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q131, Q132	2210834	2SA850(D)
Q133, Q134	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q135, Q136	2210834	2SA850(D)
Q137, Q138	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q139, Q140	2210834	2SA850(D)
Q141, Q142	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q143, Q144	2210834	2SA850(D)
Q145, Q146	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q147, Q148	2210834	2SA850(D)
Q149, Q150	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q151, Q152	2210834	2SA850(D)
Q153, Q154	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q155, Q156	2210834	2SA850(D)
Q157, Q158	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q159, Q160	2210834	2SA850(D)
Q161, Q162	2211217 or 2210755	2SC1708(G) or 2SC1775A(E)
Q163, Q164	2210834	2SA850(D)
	Diodes	
D101–D104	224022	WZ–350, Zener
D105	223802	1S1885
	Capacitors	
C101, C102	374121057	1μF±20% 50V, DE
C105–C110	390983307	33μF 50V, LM



CIRCUIT NO.	PARTS NO.	DESCRIPTION
C119, C120	390983307	33μF 50V, LM
C121, C122	390981007	10μF 50V, LM
C123, C124	374121834	0.018μF±5% 50V, DE
C125, C126	374123634	0.036μF±5% 50V, DE
C127, C128	390980337	3.3μF 50V, LM
C131–C134		
C135–C138	390881017	100μF 50V, SLD
C139–C142	352780101	1μF 50V, Elect.
C143	352784791	0.47μF 50V, Elect.
C145, C146	374121055	1μF±10% 50V, DE
C147–C150	374125144	0.51μF±5% 50V, DE
C151, C152	374129124	9,100pF±5% 50V, DE
C153, C154	390983307	33μF 50V, DM
C155, C156	374124727	4,700pF±5% 50V, DE
C157, C158	374122744	0.27μF±5% 50V, DE
C159, C160	390983307	33μF 50V, LM
C161, C162	374122424	2,400pF±5% 50V, DE
C163, C164	374121244	0.12μF±5% 50V, DE
C165, C166	390981007	10μF 50V, LM
C167, C168	374121124	1,100pF±5%, DE
C169, C170	374126834	0.068μF±5% 50V, DE
C171, C172	390981007	10μF 50V, LM
C173, C174	372326814	680pF±5% 50V, ST
C175, C176	374123034	0.3μF±5% 50V, DE
C177, C178	390980337	3.3μF 50V, LM

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C179, C180	372323314	330pF±5% 50V, ST
C181, C182	374121634	0.016μF±5% 50V, DE
C183, C184	390980337	3.3μF 50V, LM
C185, C186	372321545	150pF±5% 50V, ST
C187, C188	374128224	8,200pF±5% 50V, DE
C189, C190	390980107	1μF 50V, LM
C191, C192	372321014	100pF±5% 50V, ST
C193, C194	374123624	3,600pF±5% 50V, DE
C195, C196	390980107	1μF 50V, LM
C197, C198	372321014	100pF±5% 50V, ST
C199, C200	374121824	1,800pF±5% 50V, DE
C201, C202	390980107	1μF 50V, LM
	Metal Oxide Film Resistors	
R117–R120	441625124	5.1kΩ 1W
R169–R172	441626824	6.8kΩ 1W
R183–R186	441622724	2.7kΩ 1W
R189–R206	441626824	6.8kΩ 1W
R318–R320	441621014	100Ω 1W
	Relaies	
RL101, RL102	25065029	HA–112B

SCHEMATIC DIAGRAM
Model E-30



NOTE
1. DC VOLTAGES ([V]) ARE MEASURED WITH V.O.M.(20KΩ/V) TO CHASSIS AT NO SIGNAL APPLIED.
2. UNLESS OTHERWISE SPECIFIED.
   RESISTORS ARE IN OHMS, ±5%, 1/4W.
   CAPACITORS ARE IN μF/50V.
   ELECTROLYTIC CAPACITORS (—⊕—) ARE IN μF/WV.
3. TOLERANCE

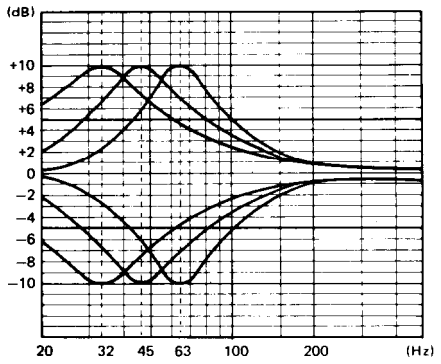
SYM.	D	G	J	K	P	Z
TOL.	±0.5pF	±2%	±5%	±10%	+100% -0%	+80% -20%

4. SYMBOL
   • LOW LEAKAGE CURRENT TYPE ELECTROLYTIC CAPACITOR.
   • NON-INFLAMMABLE RESISTOR.

ONKYO CORPORATION

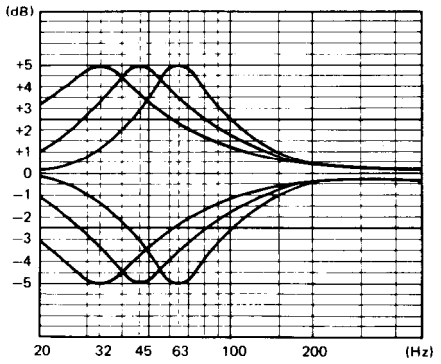
RESPONSE CHARACTERISTICS

Figure 1



Low range center frequency switch frequency response characteristics (MAX RANGE at 10 dB)

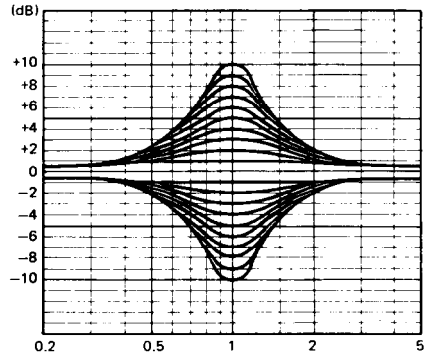
Figure 2



Low range center frequency switch frequency response characteristics (MAX RANGE at 5 dB)

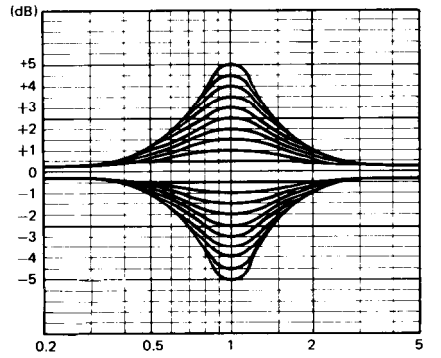
Band level controls response characteristics

Figure 3



Response characteristics at different dB settings (MAX RANGE at 10 dB)

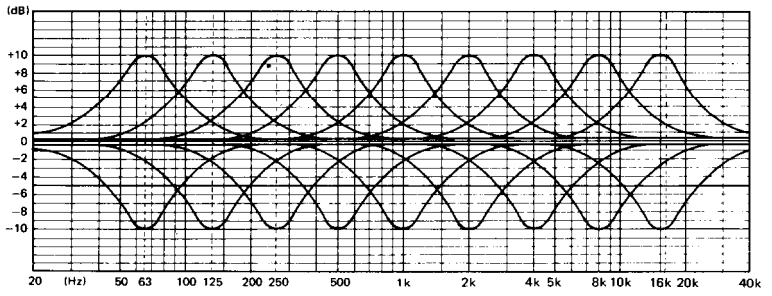
Figure 4



Response characteristics at different dB settings (MAX RANGE at 5 dB)

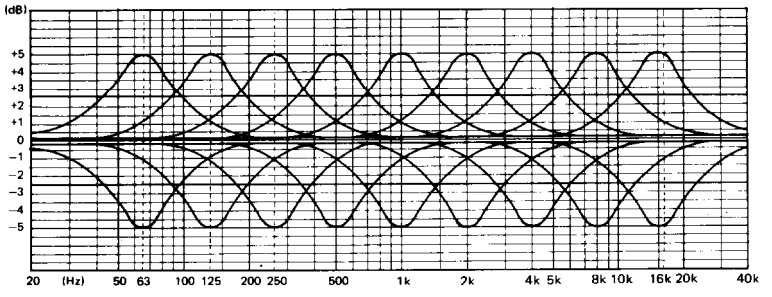
Response characteristics of all band level controls

Figure 5



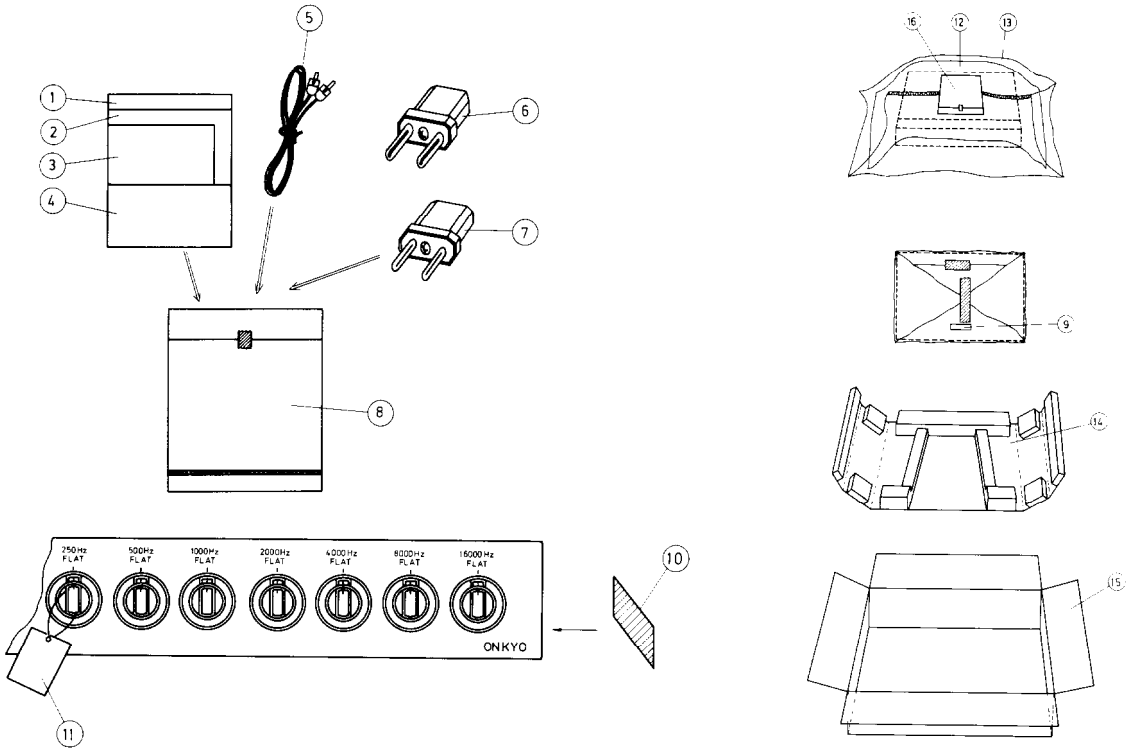
MAX RANGE at 10 dB

Figure 6



MAX RANGE at 5 dB

PACKING PROCEDURES



PARTS LIST

REF. NO.	DESCRIPTION	PARTS NO. U.S.A. model	120V model	220V model	Germany model
1	Instruction Manual	29340243	29340243	29340243	29340243
2	Service Station List	29358001	———	———	———
3	Caution Card for 4	29355046	———	———	———
4	Warranty Card	29365003	———	———	29365001-1
5	Connection Cord	24505014	24505014	24505014	24505014
6	CV-C, Conversion Plug	———	292005	292005	292005
7	CV-BS, Conversion Plug	———	292006	292006	———
8	250x350mm, Poly Bag	29100006	29100006	29100006	29100006
9	Caution Label	293041	293041	———	———
10	Caution Label A	282969	282969	———	———
11	Cabinet Composite Tag	29380031	———	———	———
12	500x800mm, Protection Sheet	29095012	29095012	29095012	29095012
13	550x850mm, Poly Bag	29100019A	29100019A	29100019A	29100019A
14	Pad	29090229	29090229	29090229	29090229
15	Carton Box	29050157	29050157	29050157	29050157
16	Accessory Bag Complete				

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